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Description

The present invention relates to a passbook printing apparatus and a page turning method according to the preambles of claims 1 and 9. Such an apparatus and such a method are known from JP-63-25 077. The apparatus and the method may be employed in bank terminal equipment.

In a passbook printer mounted in an automated teller machine or in a passbook printer to be used by a clerk in charge, the machine performs turning over pages automatically and makes printing in required positions.

Passbooks capable of being printed by such passbook printer are broadly classified into two kinds which are a side-to-side opening, or lateral opening, passbook having a sewing part perpendicular to the printing direction and a front-to-rear opening, or longitudinal opening, passbook having a sewing part parallel to the printing direction.

The passbook printer referred to above is of a mechanism which permits turning over pages for such two kinds of passbooks.

For example, in a transfer means for the transfer of a passbook in an open condition, as described in Japanese Patent Laid-Open No. 9564/1988, there is disposed a rolling member inclinedly at an angle of about 45° relative to the transfer direction of a passbook being transferred by the said transfer means. This rolling member is brought into contact with a leaf of the passbook and is rotated, allowing the leaf to expand and move in the direction of about 45° mentioned above to turn over the leaf. In this case, the leaf of the passbook is slightly curved in a convex shape by means of a press-up plate disposed on the side opposite to the rolling member of the passbook to prevent rolling up of two leaves at a time.

In the above prior art, a page rolling up roller for the passbook performs two motions one of which is a rotational motion and the other is a translational motion in the direction of about 45° relative to the passbook transfer direction. Consequently, the mechanism is complicated, and no consideration is given to the handling time, that is, the cost is high and the handling time is long.

JP-63-25 077 discloses a handling device for a booklet. It is intended to enable opening of pages of both longitudinal and lateral types of booklets with the same device. It comprises a turn roller having a turning axis disposed obliquely to the transfer direction of the booklet. During the page turning process, the entire turn roller is displaced along a lead screw disposed obliquely across the transfer path of the booklet. The device further comprises push-up plates which serve to press the booklet against the turn roller.

It is the object of the invention to provide a passbook printing apparatus and a page turning method capable of both handling longitudinal and lateral types of passbooks, the apparatus being simple in mechanism, the method being easy to be carried out and both allowing short handling time.

This object is solved in accordance with the features of the independent claims. Dependent claims are directed on preferred embodiments of the invention.

For achieving the object, a page turning roller is disposed in an obliquely intersecting relation to the passbook transfer direction, and a paper guide which substantially intersects the rotating direction of the page turning roller perpendicularly is disposed in the vicinity of the page turning roller.

In turning a page of a passbook according to the present invention, a hollow page turning roller disposed obliquely relative to the transfer direction rotates and rolls up the top page of the passbook while contacting the page. When this page is rolled up to a certain extent, the passbook is transferred so that the page thus rolled up strikes against a paper guide which is disposed obliquely relative to the transfer direction. As a result, this page strikes obliquely against the paper guide and receives a reaction force. If the angle between the transfer direction and the guide surface direction is θ, the said reaction force acts in a direction of angle $\alpha°$ ($\alpha° = 360° - \theta°$) from the paper guide surface. Therefore, the rolled-up page of the passbook is moved in the angle $\alpha°$ direction from the paper guide surface. This movement means a rotational motion of the said page around the sewing part as a central line. Thus, the paper guide disposed obliquely relative to the transfer direction acts to turn the page of the passbook in cooperation with the transfer force.

The passbook which has been inserted from a passbook inlet of the printer is detected its type from the position of a magnetic stripe stuck on the cover of the passbook and also from information recorded in the magnetic stripe. Then in accordance with the detected signal there are performed positioning of the passbook and a page turning operation, followed by printing by a printing unit.

Fig. 1 is a partially sectional plan view showing a principal portion of a passbook printing apparatus according to an embodiment of the present invention;

Fig. 2 is a partially sectional side view of Fig. 1;

Figs. 3 and 4 are views showing examples of passbooks capable of being handled by the apparatus of Fig. 1;

Fig. 5 is a view showing an example of a page turning roller illustrated in Fig. 1;

Figs. 6 to 16 are explanatory views of page turning operations for a side-to-side opening

type passbook in the apparatus of Fig. 1, of which Figs. 6 to 11 are partially sectional side views, and Figs. 12 to 16 are partially sectional plan views;

Figs. 17 to 22 are partially sectional side views explanatory of page turning operations for a front-to-rear opening type passbook in the apparatus of Fig. 1;

Fig. 23 is a view explanatory of a dynamical relation between a passbook page turning force and a buckling force;

Fig. 24 is a view showing the relation between a deformation of a passbook when a page thereof is turned and a reaction force;

Figs. 25 and 26 show other examples of the page turning roller illustrated in Fig. 1;

Fig. 27 is a view showing a constructional example of a passbook printer according to the present invention;

Figs. 28 to 31 show examples of passbooks capable of being handled by the printer of Fig. 27;

Fig. 32 is a passbook handling flow chart in the printer of Fig. 27; and

Fig. 33 is a schematic perspective view showing an example of an automated teller machine having the printer of Fig. 27.

An embodiment of the present invention will be described below.

Fig. 1 is a partially sectional plan view showing a principal portion of a passbook printing apparatus according to an embodiment of the present invention, and Fig. 2 is a partially sectional side view of Fig. 1.

Figs. 3 and 4 illustrate passbooks to be handled by the apparatus, of which Fig. 3 shows a side-to-side opening, or lateral opening, type passbook 1, while Fig. 4 shows a front-to-rear opening, or longitudinal opening, type passbook 4. In the side-to-side opening type passbook 1 shown in Fig. 3, pages are turned in a turning direction B with a sewing part 2 as the center. The direction of the sewing part 2 and that of a printing 3 are in an orthogonal relation. Usually, the passbook 1 is inserted in a direction A into a printer (not shown).

In the front-to-rear opening type passbook 4 shown in Fig. 4, pages are turned in a turning direction B with a sewing part 2 as the center. In the passbook 4, unlike the side-to-side opening type passbook 1, the direction of the sewing part 2 is in parallel with the direction of the printing 3. The passbook 4 is usually inserted in a direction A into the printer and is opposed to a guide plate 5 serving as a first guide in Figs. 1 and 2.

A paper guide 6 as a third guide and a paper guide 7 as a second guide provide a suitable gap in an out-of-plane direction of the figures to form a passbook transfer path. The guide plate 5 and the paper guide 7 are mounted between frames 12 and 13. The paper guide 6 is mounted to the frame 12 which is disposed on the side opposite to the side where a later-described page turning roller 10 is disposed with respect to the passbook transfer direction. A span L_5 between the frames 12 and 13 must at least be longer than the width in the passbook printing direction shown in Figs. 3 and 4. A line 14 represents a path obtained by following the transfer of the sewing part 2 of the passbook 1 of Fig. 3 in the transfer direction A. A span L_6 of the paper guide 6 is set so as to be at least shorter than the span L_5. The page turning roller 10 is disposed on one side with respect to the center of the passbook transfer direction above the guide plate 5. As shown in Fig. 1, the paper guide 7 and a rotary shaft 21 of the page turning roller 10 obliquely intersect the transfer direction A. The page turning roller 10 is driven by a motor 11 through a belt 20. It may be driven by any other suitable method. In the portion where the paper guide 6 is disposed, transfer rollers 8 are disposed rotatably so as to be in face-to-face contact with transfer rollers 27. On the other hand, in the portion where the paper guide 7 is disposed, a transfer roller 9 is disposed rotatably through a mounting piece 24 so as to be in face-to-face contact with a transfer roller 26, and also disposed are transfer rollers 22 rotatably through mounting pieces 25. The distance L_7 between the transfer rollers 8 and 9 and the distance L_8 between the transfer rollers 9 and 22 must at least be shorter than the length in the transfer direction of the passbook 1 or 4. On the other hand, the distance L_9 between the transfer rollers 8 and 22 must at least be longer than the length in the transfer direction of the passbook. The reason is that when a leaf of the passbook 1 or 4 which has been rolled up by the page turning roller 10 is rotated around the sewing part 2 along the paper guide 7, there initially occurs the page displacement thereof in the transfer direction and that in order for the said displacement to be eliminated by a restoring force based on the stiffness of the paper and the constraint of the sewing part, it is necessary to make free the rolled-up leaf of the passbook temporarily. A sensor 15 is provided for determining a stop position of the passbook 1 or 4.

Fig. 5 shows a concrete example of the page turning roller 10 used in this embodiment. The roller 10 is provided with a boss 111 and a frictional contact portion 112. The frictional contact portion 112 has a structure capable of absorbing changes in thickness of the passbook through elastic deformations, which structure is a hollow elastic structure having a hollow part 113 and constituted by a high friction member such as chloroprene or natural rubber. The shape of the frictional contact portion 112 is defined by a first curved surface 114

having a first profile curve and a second curved surface having a second profile curve. The first and second curved surfaces 114 and 115 may have straight profile lines in place of curves. The boss 111 is formed of a sintered alloy such as iron and has a central recess 116 for fitting therein of the rotary shaft 21. The boss 111 and the frictional contact portion 112 are bonded together through rubber lining. After the bonding, stepped areas are formed between the boss 111 and the frictional contact portion 112 to constitute picker means 117.

The picker means 117 come into engagement with the front end of rolled-up paper surface, and if this portion is coated with a friction member such as rubber, the retaining force after the engagement with the paper surface will be enhanced.

Page turning operations for the side-to-side opening type passbook 1 will be described below with reference to Figs. 6 to 16, of which Figs. 6 to 11 are side views explanatory of operations and Figs. 12 to 16 are plan views.

The passbook 1 is transferred while being sandwiched in between the transfer rollers 8 and 27 and enters the page turning unit, then stops in the page turning position (Fig. 6) in accordance with a command issued from the sensor 15. At this time, a page 1a having a mark 28 is positioned on the page turning roller 10 side with respect to the sewing part 2 of the passbook 1 as a center line (Fig. 12). Then, the motor 11 is operated to rotate the page turning roller 10 in a rolling direction C, whereby the top page 1a of the passbook 1 is rolled up as if it were fed to the sewing part 2 (Fig. 7). The reason why the page 1a hides the transfer rollers 8 in this figure is that the transfer rollers 8 and the paper guide 6 have not crossed the guide plate 5, as shown in Fig. 1, thus permitting the page 1a of the passbook 1 to move in an out-of-plane direction in Fig. 1. The page turning roller 10 makes approximately one rotation and stops in its stop position (Figs. 8 and 13). Next, the transfer rollers 8, 27 and 9, 26 are rotated in a rotational direction $\underline{e}$ to transfer the passbook 1 in a transfer direction $\underline{E}$, so that the page 1a which has been rolled up to a certain extent is further rolled up (Fig. 9).

At this time, as shown in Fig. 14, the page 1a strikes against the paper guide 7 and imparts a striking force $\underline{f}$ to the guide 7. Since the paper guide 7 obliquely intersects the transfer direction of the passbook 1 as mentioned above, the force $\underline{f}$ is divided into a normal force f_n and a tangential force f_t. The tangential force f_t serves to impart a rotating motion with the sewing part 2 as a central line to the page 1a of the passbook 1. Subsequently, as the transfer rollers 8, 27 and 9, 26 are rotated in the rotational direction $\underline{e}$ to transfer the passbook 1 in the transfer direction $\underline{E}$, the page 1a is repulsed strongly by virtue of the stiffness of the paper and the paper guide 7 (Fig. 10). When the passbook 1 is further transferred in this state, the page 4a is rolled up to the opposite side with the sewing part 2 as a central line, as shown in Fig. 15, resulting in that the mark 28 is hidden on the back side. As the passbook 1 is further transferred in the transfer direction D, the page 4a is turned completely. After this page turning operation is over, the passbook 1 is further transferred in the direction D, whereby the passbook in a page-turning completed form is fed to a place other than the page turning unit (e.g. to the printing unit). In this way a series of page turning operations are completed. (Figs. 11 and 16)

Now, page turning operations of the front-to-rear opening type passbook 4 will be described with reference to Figs. 17 to 23.

The passbook 4 is transferred while being sandwiched in between the transfer rollers 8 and 27 and enters the page turning unit, and upon detection thereof by the sensor 15 the passbook 4 stops in a predetermined stop position or page turning position (Fig. 17). Next, the page turning roller 10 rotates in the rolling direction C and begins to contact a top page 1a of the passbook 1 (Fig. 18). When the page turning roller 10 makes approximately one rotation and stops in a predetermined position, the page 4a assumes a rolled-up form (Fig. 19). Then, the transfer rollers 9, 26 and 8, 27 rotate in a rotational direction $\underline{d}$ to convey the passbook 4 in a transfer direction $\underline{D}$, so that the page 1a strikes against the paper guide 7 to create a force acting in a direction in which the page performs a rotating motion with the sewing part 2 of the passbook 4 as a central line, namely a force acting in a direction parallel to the end face in the transfer direction of the paper guide 7 (Fig. 20). Under the action of this force the page 1a begins to turn. As the passbook 4 is further transferred, the page 4a positioned on the side of the page turning roller 10 of the passbook 4 turns to the opposite side with the sewing part 2 of the passbook as the center (Fig. 21). When the passbook 4 is further transferred in this state, the page 4a is turned completely. After this page turning operation is over, if the passbook 4 is further transferred, it is fed in the page-turning completed form to a plage (e.g. the printing unit) other than the page turning unit. In this way a series of operations are completed (Fig. 22).

In the page turning operation for the passbook 1 or 4 described above, the page thickness differs, depending on the page to be rolled up. Further, a cover and thin papers differ in rigidity and frictional resistance. However, since the page turning roller 10 is of a hollow structure in which the frictional contact portion 112 has the hollow part 113, the

rolling up of page is effected an optimal rolling force.

Fig. 23 shows a dynamical relation of the page turning mechanism, in which there are illustrated dynamical models of thin paper 50X, thin paper 50Y and cover 50Z of a passbook which is apt to be rolled up two leaves at a time. The property of eliminating a dynamical boundary at the front end portion of the paper guide 6 can be approximated to fixed conditions. It is necessary that there be a relation of $F > f_1 + P_1$ among a rolling force F, a frictional force f_1 between the thin papers 50X and 50Y, and a buckling resistance P_1 of the thin paper 50X. The rolling force F can be expressed as the product, $F = \mu_0 \times g_0$, of a frictional coefficient μ_0 between the paper surface and the frictional contact portion 112 of the page turning roller 10 and a reaction force g_0 against compression of the frictional contact portion 112. On the next thin paper 50Y there are exerted a frictional force $f_1 = \mu_1 \times g_0$ which is determined by a frictional coefficient μ_1 between the thin paper 50X to be rolled up and the next thin paper 50Y and the aforementioned reaction force g_0, a frictional force $f_2 = \mu_2 \times g_0$ which is determined by a frictional coefficient μ_2 between the next thin paper 50Y and the cover 50Z and the aforesaid reaction force g_0, and a buckling resistance P_2. These forces must satisfy the reaction of $f_1 - f_2 \leq P_2$. If this relation is not satisfied, the next thin paper 50Y will also be rolled up together with the thin paper 50X to be rolled up. In the above relation, the difference between the frictional forces inevitably corresponds to the difference between the frictional forces, i.e. $f_1 - f_2 = (\mu_1 - \mu_2) \times g_0$.

Fig. 24 shows the relation of reaction force (g) - deformation (x) obtained when the frictional contact portion 112 of the page turning roller 10 shown in Fig. 5 is compressed. In Fig. 24, a curved line 201 is a reaction force - deformation curve of a conventional solid, page turning roller, while a reaction force - deformation curve 202 is of the structure having the hollow part 113 in the frictional contact portion 112 like the page turning roller 10. The curve 202 has a non-linear point of inflexion as shown in the same figure, including an area 210 which is very insensible to the deformation x. The deformation x corresponds to a value obtained by subtracting a central height of the rotary shaft which supports the page turning roller 10 shown in Fig. 5 and the thickness of the passbook which is determined by the number of pages, from the maximum outside diameter of the roller 10. The reference mark g_1 represents a force which one roller is required to generate for rolling up a thin paper of the passbook, while g_2 represents a force which one roller is required to generate for rolling up the cover of the passbook. It is a first conversion curve 203 that is obtained by integrating the reaction force g_0 with the frictional coefficient μ_0 between the frictional contact portion 112 and the paper surface. And it is a conversion curve 204 that is obtained by integrating variations in the frictional coefficient between papers with the curve 202. When the curve 203 is in the region exceeding the reaction force g_1, it is possible to generate a reaction force for rolling up a paper. On the other hand, if the curve 204 is in the region exceeding g_1, there will occur an error. In other words, a wide optimal deformation range indicates a wide margin for assembly, etc. The reason why a margin 211 is wide in this figure is because the curve 202 includes the area 210 which is insensible to deformation.

It is apparent that even if the margin is obtained from the reaction force - deformation curve of the conventional page turning roller, it is smaller than that in this embodiment.

Fig. 25 shows another example of a page turning roller employable in the present invention. In this example, the page turning roller 10 is provided with a frictional contact portion 112 having a curved profile surface constituted by a single profile curve. So constituting the frictional contact portion 112 of the page turning roller 10 is advantageous in that it becomes easier to make a mold and produce the roller.

Fig. 26 shows a further example of a page turning roller employable in the present invention. A characteristic feature of this page turning roller resides in picker means 117. More specifically, this page turning roller 10 comprises a boss 111, a frictional contact portion 112 having a hollow part 113, and a picker means 117. In the picker means 117 there is a stepped portion between the boss 111 and the frictional contact portion 112, and a maximum outside radius r_2 of a picker part 121 of the boss 111 is larger than a maximum outside radius r_3 of a picker part 122 of the frictional contact portion 112. Consequently, the boss 111 is in a projecting form in its shoulder portion. Such a positional relation is advantageous in that the frictional contact portion 112 prevents the page which was rolled up by said frictional contact portion 112 from falling and never touch another pages.

Therefore, said frictional contact portion 112 never produce jam.

According to this embodiment, as set forth above, there can be provided a page turning apparatus capable of turning a page of a front-to-rear opening type passbook and of a side-to-side opening type passbook positively in a simple structure without using a complicated mechanism such as an oblique moving means for the page turning roller or a pressing means.

Fig. 27 is an explanatory view of a passbook printer according to an embodiment of the present invention. The printer basically comprises a trans-

fer system consisting of a transfer path having a passbook inlet 36 and a guide plate 5 and transfer rollers 8, 27, 9, 26, 22, 29, 30, 31, 32, 33, 34, 35 which are driven by a transfer motor 42; sensors 15, 37 and 40 for detecting whether the passbook 1 for example is present or not; a printing unit 41; an optical character sensor 39 and an optical character reader 45 both for reading information such as bar code; a magnetic information sensor 38 such as a magnetic head and a magnetic information reader 44 both for reading information such as a magnetic stripe; a page turning unit comprising a page turning roller 10 driven by a page turning motor 11 and a paper guide 7; an interface 47; a computation unit 48; an information controller 49; and an information input/output controller for the exchange of information for a power source, external computers, etc.

Figs. 28 and 29 show respectively a front-to-rear opening type passbook 57 having a magnetic stripe 54 in a direction substantially parallel to a transfer direction A of the passbook and a front-to-rear opening type passbook 58 having a magnetic stripe 55 in a direction substantially orthogonal to the passbook transfer direction A.

The following description is now provided about reading magnetic information recorded on the front-to-rear opening type passbook, etc. with reference to Figs. 27, 28 and 29.

Explanation will first be made about how to read magnetic information recorded on the front-to-rear opening type passbook 57 having the magnetic stripe 54 in a direction substantially parallel to the passbook transfer direction A, with reference to Figs. 27 and 28. In this case, when the passbook 57 is stopped in a predetermined position, the magnetic information sensor 38 shown in Fig. 27 moved in an arrowed direction 56 in Fig. 28 with respect to the magnetic stripe 54 to detect the position of the stripe 54 and the direction of the magnetic information, and stops in that position. In this state, the passbook 57 is moved in the direction A, whereby the magnetic information written in the magnetic stripe 54 is read.

On the other hand, for reading magnetic information written in the front-to-rear opening type passbook 58 having the magnetic stripe 55 in a direction substantially orthogonal to the passbook transfer direction, the sensor 38 is scanned in the arrowed direction 56 in Fig. 29 while the passbook 58 is stopped in a predetermined position, to read the magnetic information written in the magnetic stripe 55.

Now, the following description is provided about how to read magnetic information written in a side-to-side opening type passbook, etc. with reference to Figs. 27, 30 and 31.

In Fig. 30 there is illustrated a side-to-side opening type passbook 59 having a magnetic stripe 60 in a direction substantially orthogonal to a passbook transfer direction B. In this case, the passbook 59 is stopped in a predetermined position and in this state the magnetic sensor 38 is scanned in the arrowed direction 56 to read magnetic information.

In Fig. 31 there is illustrated a side-to-side opening type passbook 61 having a magnetic stripe 62 in a direction substantially parallel to the transfer direction B. In this case, the magnetic sensor 38 is scanned in the arrowed direction 56 while the passbook 61 is stopped in a predetermined position, to detect the position of the magnetic stripe 62 and the direction of magnetic information. Then, a position of the magnetic sensor 38 is determined on the basis of the results obtained and the sensor 38 is shifted to that position to read the magnetic information written in the magnetic stripe 62 while the passbook 61 is moved in the transfer direction B.

Fig. 32 shows a flow of handling of a passbook to be subjected to the page turning operation in the printer illustrated in Fig. 32. The passbook is stopped in a predetermined position by controlling the rotation of each roller of the transfer system (step 63); the magnetic information sensor 38 is scanned to judge the type of the passbook as well as magnetic information reading direction and reading method (step 64); and the magnetic information is read (step 65). On the basis of the information thus read, a stop position of the passbook in the printing unit 41 and a printing method are determined by calculation in a central computation unit (step 66), then in accordance with the results obtained the passbook is stopped in that position and printing is performed by the printing unit 41 (step 67). Next, whether the turning of page is necessary or not is judged (step 68), and if the answer is affirmative, the passbook is shifted to a predetermined stop position in the page turning unit in accordance with the information such as the type of the pass book already detected (step 69). The said stop position indicates a position in which the passbook can be detected by the sensor 15. Since the passbook length in the direction orthogonal to the passbook transfer direction differs, depending on each passbook, it is necessary to change the amount of shift toward the frame 13 shown in Fig. 1. Subsequently, the page turning roller 10 is operated to perform the page turning operation (step 70), and after turning over of the page to be turned, the passbook is transferred to the printing unit. Where it is not necessary to turn a page, predetermined information is written in the magnetic stripe of the passbook and thereafter the passbook is discharged (step 71).

Although in the above page turning method, the position of the page turning roller 10 is fixed and the passbook is shifted in the direction orthogonal to the transfer direction and disposed in an appropriate position, there may be adoped a construction in which the page turning roller 10 is made movable in the direction orthogonal to the passbook transfer direction and the shift of the passbook is not performed.

Fig. 33 shows an automated teller machine embodying the present invention. The automated teller machine, indicated at 72, basically comprises a bill/coin handling device 73, an operating unit 74 comprising a display and a keyboard, a card/slip handling mechanism 76 for subjecting a card inserted from an insertion/discharge slit 75 to predetermined processings and then discharging both a slip and the card through the slit 75, and a passbook handling device 78 for subjecting a passbook such as a bankbook inserted from an insertion opening 77 to predetermined processings.

As described above in connection with Figs. 27 to 32, once the passbook is inserted from the insertion opening 77, the type of the passbook, that is, whether the passbook is a front-to-rear opening type or a side-to-side opening type, the stuck position of a magnetic stripe, and read/write method, are detected and suitable printing method and page turning method for the passbook are selected in accordance with the information obtained.

In such automated teller machine, also when the user inserts a side-to-side or front-to-rear opening type passbook from the passbook insertion opening 77, predetermined processings can be performed for the passbook.

According to the present invention, as set forth hereinabove, turning of a page can be done by a simple structure for both front-to-rear and side-to-side opening type passbooks, and printing to both types of passbooks can be done in a short time by a simple mechanism.

Claims

1. A passbook printing apparatus comprising
   - a first guide (5) for forming a transfer path for a passbook,
   - page turning means (10) disposed so as to obliquely intersect the passbook transfer direction for coming into frictional contact with a predetermined page (1a, 4a) of the passbook (1, 4) and lifting this page, and
   - transfer means (8, 9, 22) for transferring the passbook (1, 4) along the transfer path,

   characterized in
   - further comprising a second guide (7) forming the transfer path in cooperation with the first guide (5), and
   - that the second guide (7) is disposed in opposed relation to the first guide (5) and is also disposed so as to obliquely intersect the passbook transfer direction, the page turning means (10) being disposed in the vicinity of the second guide (7) on its upstream portion.

2. An apparatus according to claim 1, characterized in further comprising a third guide (6) disposed in opposed relation to the page turning means (10) with respect to the center in the passbook transfer direction of the transfer path at a predetermined distance to form a transfer path in cooperation with the first guide (5).

3. An apparatus according to claim 1 or 2, characterized in that the frictional contact portion (112) of the page turning means (10) has at least one point of inflection in a deformation-reaction force curve thereof.

4. An apparatus according to claim 3 or claim 1, characterized in that the page turning means (10) has a frictional contact portion (112) of a structure which absorbs changes in thickness of the passbook through elastic deformations.

5. An apparatus according to claim 4, characterized in that the frictional contact portion (112) of the page turning means (10) has a hollow elastic structure.

6. An apparatus according to claim 4 or claim 5, characterized in that the frictional contact portion (112) of the page turning means (10) is attached to a rotatable boss (111) of a low frictional coefficient, and a stepped portion capable of engaging the front end of the paper to be rolled up is formed at the boundary of the boss (111) and the frictional contact portion (112) to thereby constitute picker means (117).

7. An apparatus according to claim 4 or claim 5, characterized in that the page turning means (10) has a rotatable boss (111), the frictional contact portion (112) being attached to the boss and having a structure capable of absorbing changes in thickness of the passbook (1, 4) through elastic deforma-

tions, picker means (117) formed at the boundary of said boss (111) and said frictional contact portion (112) for engagement with the front end of the paper to be rolled up, and a projecting portion projecting from the boss for engagement with a guide member, the guide member being provided on its lower end side with a first contact portion and a second contact portion, both for selective engagement with the projecting portion of the boss (111) with rotation of the page turning means (10).

8. A page turning method for turning a predetermined page
of a passbook, comprising the steps of
- transferring the passbook along a transfer path, and
- lifting said page of the passbook,

characterized in further comprising the step of
- pressing the lifted page against a guide disposed obliquely across the transfer path, and
- further transferring the passbook along the transfer path, thereby and by the action of the guide turning said page.

Patentansprüche

1. Sparbuch-Druckvorrichtung mit
- einer ersten Führung (5) zur Bildung eines Transportwegs für ein Sparbuch,
- einer Seitenumblättereinrichtung (10), die so angebracht ist, daß sie die Transportrichtung des Sparbuchs schräg schneidet und in Reibkontakt mit einer vorbestimmten Seite (1a, 4a) des Sparbuchs (1, 4) kommt und diese Seite anhebt, und
- einer Transporteinrichtung (8, 9, 22) zum Transportieren des Sparbuchs (1, 4) längs des Transportwegs,

dadurch gekennzeichnet, daß
- außerdem eine zweite Führung (7) vorgesehen ist, die im Zusammenwirken mit der ersten Führung (5) den Transportweg bildet, und
- die zweite Führung (7) gegenüber der ersten Führung (5) und außerdem so angebracht ist, daß sie die Sparbuch-Transportrichtung schräg schneidet, wobei die Seitenumblättereinrichtung (10) in der Nähe der zweiten Führung (7) an deren stromaufwärtigen Seite angebracht ist.

2. Vorrichtung nach Anspruch 1,
weiter gekennzeichnet durch
eine dritte Führung (6), die in bezug auf die Mitte in der Sparbuch-Transportrichtung des Transportwegs gegenüber der Seitenumblättereinrichtung (10) unter einem vorbestimmten Abstand angebracht ist, um in Zusammenwirkung mit der ersten Führung (5) einen Transportweg zu bilden.

3. Vorrichtung nach Anspruch 1 oder 2,
dadurch gekennzeichnet, daß
der Reibkontaktbereich (112) der Seitenumblättereinrichtung (10) in seiner Verformungs-Reaktionskraft-Kurve zumindest einen Wendepunkt hat.

4. Vorrichtung nach Anspruch 1 oder 3,
dadurch gekennzeichnet, daß
die Seitenumblättereinrichtung (10) einen Reibkontaktbereich (112) hat, der durch elastische Verformung Änderungen in der Dicke des Sparbuchs ausgleicht.

5. Vorrichtung nach Anspruch 4,
dadurch gekennzeichnet, daß
der Reibkontaktbereich (112) der Seitenumblättereinrichtung (10) einen hohlen elastischen Aufbau hat.

6. Vorrichtung nach Anspruch 4 oder 5,
dadurch gekennzeichnet, daß
der Reibkontaktbereich (112) der Seitenumblättereinrichtung (10) an einem runden Vorsprung (111) mit niedrigem Reibkoeffizienten befestigt ist, und daß an der Grenze zwischen dem runden Vorsprung (111) und dem Reibkontaktbereich (112) ein gestufter Bereich ausgebildet ist, der das Vorderende des hochzurollenden Papiers erfassen kann, um so eine Erfassungseinrichtung (117) zu bilden.

7. Vorrichtung nach Anspruch 4 oder 5,
dadurch gekennzeichnet, daß
die Seitenumblättereinrichtung (10) einen drehbaren runden Vorsprung (111) hat, wobei der Reibkontaktbereich (112) an dem runden Vorsprung befestigt ist und einen Aufbau hat, der Änderungen der Dicke der Sparbücher (1, 4) durch elastische Deformation ausgleichen kann, daß eine Erfassungseinrichtung (117) vorgesehen ist, die an der Grenze zwischen dem runden Vorsprung (111) und dem Reibkontaktbereich (112) ausgebildet ist, um das Vorderende des hochzurollenden Papiers zu erfassen, daß ein vorspringender Bereich vorgesehen ist, der vom runden Vorsprung hervorsteht, vorgesehen ist, um in ein Führungsbauteil einzugreifen, wobei das Führungsbauteil an seiner unteren Endseite mit einem ersten Kontaktbereich und einem zweiten Kontaktbereich versehen ist, die beide dem wähl-

baren Eingriff mit dem hervorstehenden Bereich des runden Vorsprungs (111) bei Drehung der Seitenumblättereinrichtung (10) dienen.

8. Seitenumblätterverfahren zum Umblättern einer vorbestimmten Seite eines Sparbuchs, mit den Schritten
   - Transportieren des Sparbuchs längs eines Transportwegs, und
   - Anheben der Seite des Sparbuchs,

   weiter **gekennzeichnet** durch die Schritte
   - Drücken der angehobenen Seite gegen eine Führung, die schräg über den Transportweg hinweg angebracht ist, und
   - weiter Transportieren des Sparbuchs längs des Transportwegs, so daß dadurch sowie durch die Wirkung der Führung die Seite umgeblättert wird.

Revendications

1. Appareil d'impression de passeport, comprenant
   - un premier guide (5) destiné à former un trajet de transport d'un passeport,
   - un dispositif (10) destiné à tourner les pages, placé afin qu'il recoupe obliquement la direction de transport du passeport afin qu'il vienne en contact par friction avec une page prédéterminée (1a, 4a) du passeport (1, 4) et soulève cette page, et
   - un dispositif (8, 9, 22) de transport du passeport (1, 4) le long du trajet de transport,

     caractérisé en ce que
   - il comporte en outre un second guide (7) formant le trajet de transport en coopération avec le premier guide (5), et
   - le second guide (7) est disposé en face du premier guide (5) et est aussi disposé afin qu'il recoupe obliquement la direction de transport de passeport, le dispositif (10) destiné à tourner les pages étant placé au voisinage du second guide (7) dans sa partie amont.

2. Appareil selon la revendication 1, caractérisé en ce qu'il comporte en outre

   un trojsième guide (6) disposé en face du dispositif (10) destiné à tourner les pages par rapport au centre dans la direction de transport de passeport du trajet de transport à une distance prédéterminée afin qu'un trajet de transport soit formé en coopération avec le premier guide (5).

3. Appareil selon la revendication 1 ou 2, caractérisé en ce que la partie (112) de contact par friction du dispositif (10) destiné à tourner les pages comporte au moins un point d'inflexion sur une courbe déformation-force de réaction.

4. Appareil selon la revendication 3 ou 1, caractérisé en ce que le dispositif (10) destiné à tourner les pages a une partie (112) de contact par friction d'une structure qui absorbe les variations d'épaisseur du passeport par déformation élastique.

5. Appareil selon la revendication 4, caractérisé en ce que la partie (112) de contact par friction du dispositif (10) destiné à tourner les pages a une structure élastique creuse.

6. Appareil selon la revendication 4 ou 5, caractérisé en ce que la partie (112) de contact par friction du dispositif (10) destiné à tourner les pages est fixée à une protubérance rotative (111) ayant un faible coefficient de frottement, et une partie à gradin qui peut coopérer avec l'extrémité avant du papier qui doit être enroulée est formée à la limite de la protubérance (111) et de la partie (112) de contact par friction afin qu'un dispositif (117) de prélèvement soit constitué.

7. Appareil selon la revendication 4 ou 5, caractérisé en ce que le dispositif (10) destiné à tourner les pages possède une protubérance rotative (111), la partie (112) de contact par friction étant fixée à la protubérance et ayant une structure permettant l'absorption des changements d'épaisseur du passeport (1, 4) par déformation élastique, un dispositif (117) de prélèvement est formé à la limite de la protubérance (111) et de la partie (112) de contact par friction afin qu'il soit au contact de l'extrémité avant de la feuille de papier à enrouler, et une partie en saillie dépasse de la protubérance afin qu'elle coopère avec un organe de guidage, l'organe de guidage étant muni, du côté de son extrémité inférieure, d'une première partie de contact et d'une seconde partie de contact, toutes deux destinées à coopérer sélectivement avec la partie en saillie de la protubérance (111) lors de la rotation du dispositif (10) destiné à tourner les pages.

8. Procédé destiné à tourner une page prédéterminée d'un passeport, comprenant les étapes suivantes
   - le transport du passeport le long d'un trajet de transport, et

- le soulèvement de la page du passeport,

caractérisé en ce qu'il comporte en outre les étapes suivantes

- l'application d'une pression à la page soulevée contre un guide disposé obliquement en direction transversale au trajet de transport, et
- le transport supplémentaire du passeport le long du trajet de transport, à son niveau et sous l'action du guide qui tourne la page.

FIG. 1

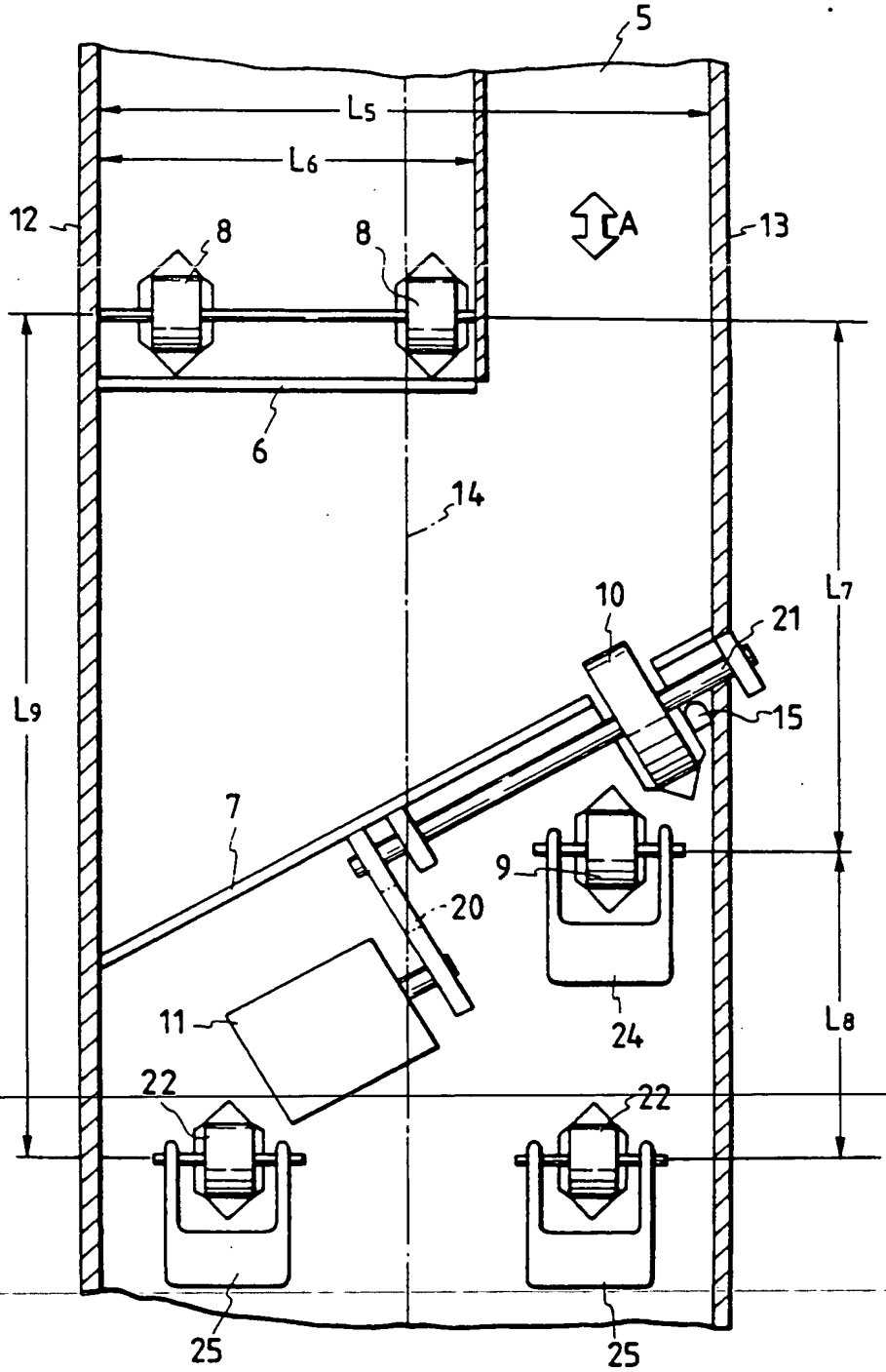


FIG. 2

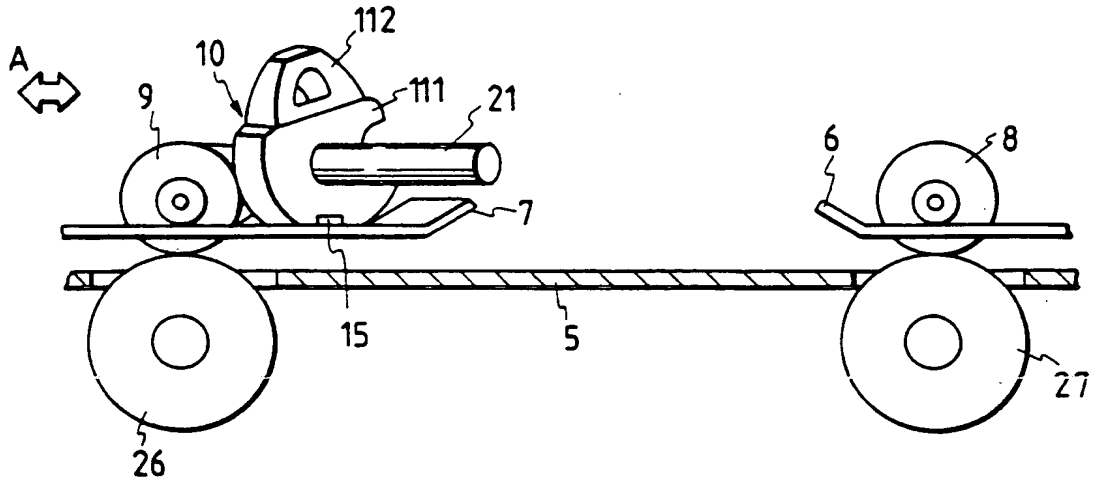


FIG. 3

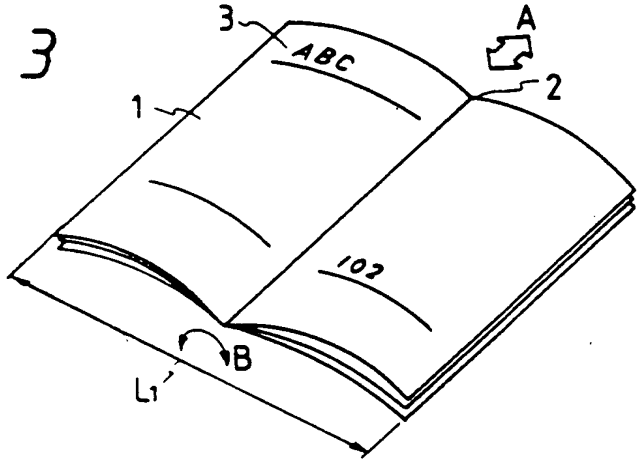


FIG. 4

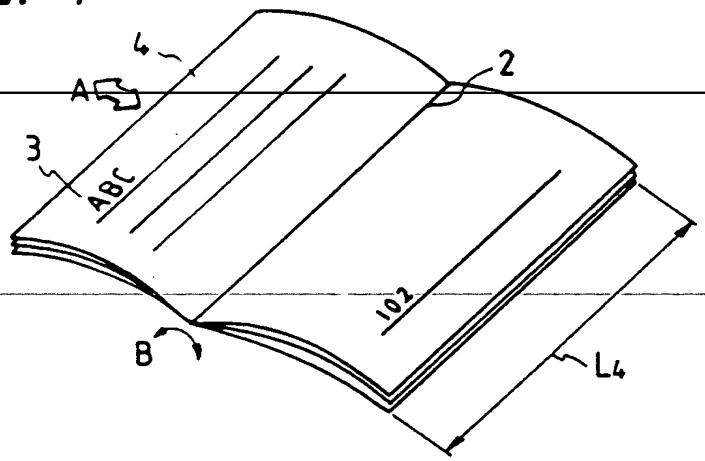


FIG. 5

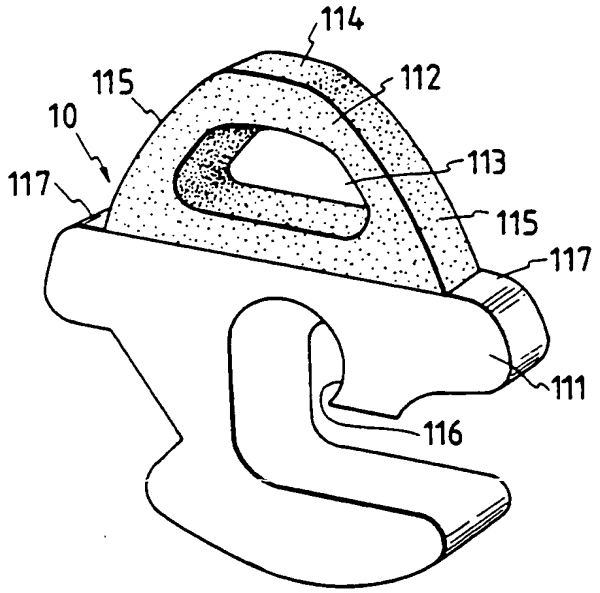


FIG. 6

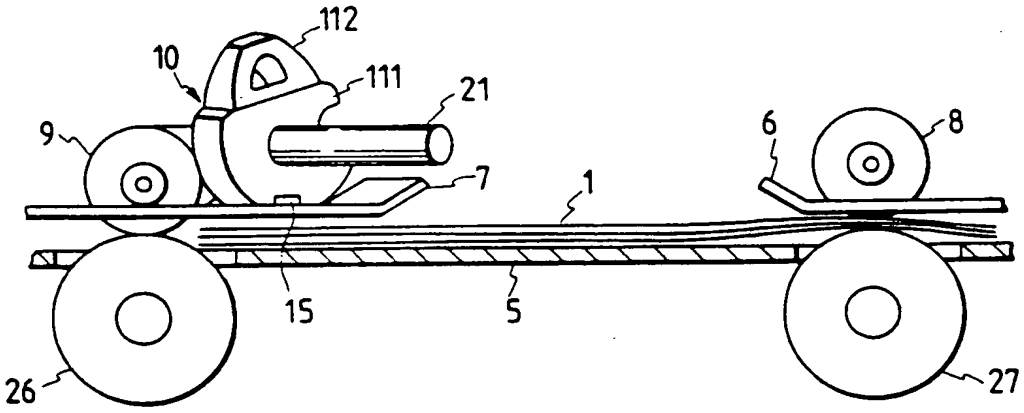


FIG. 7

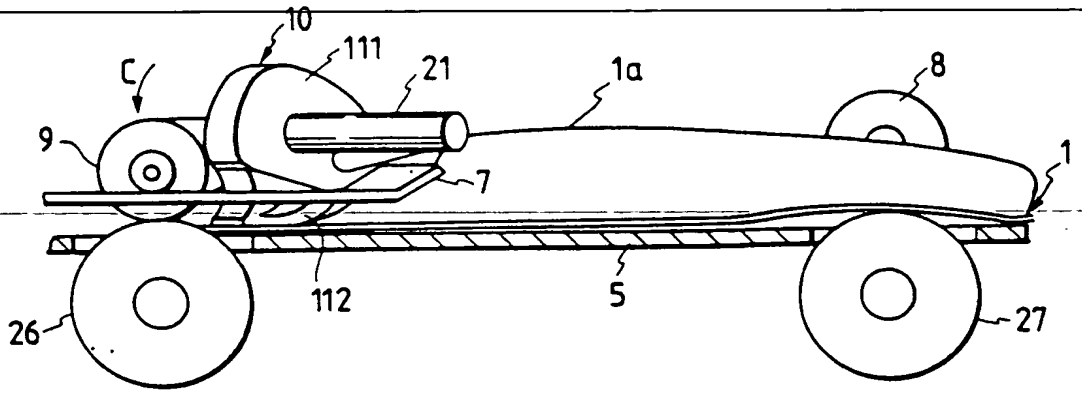


FIG. 8

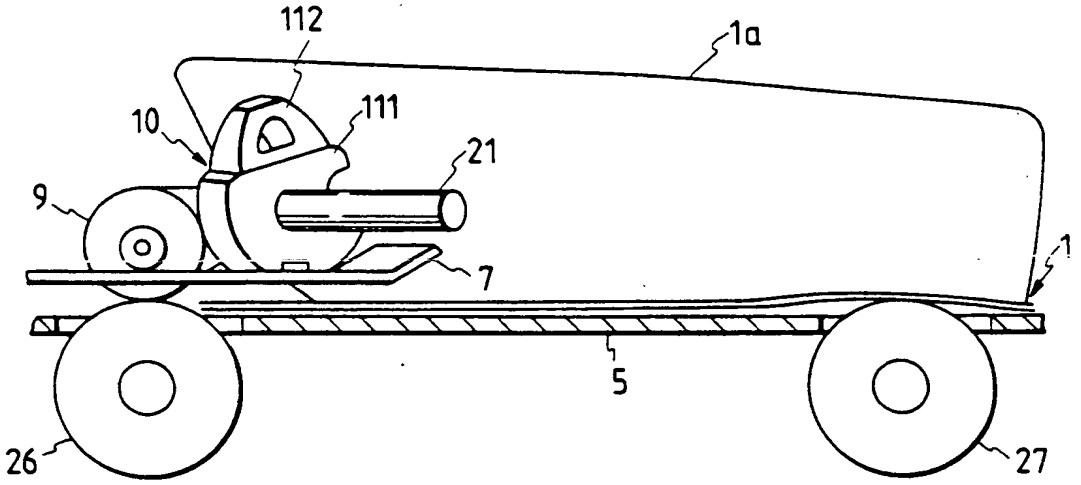


FIG. 9

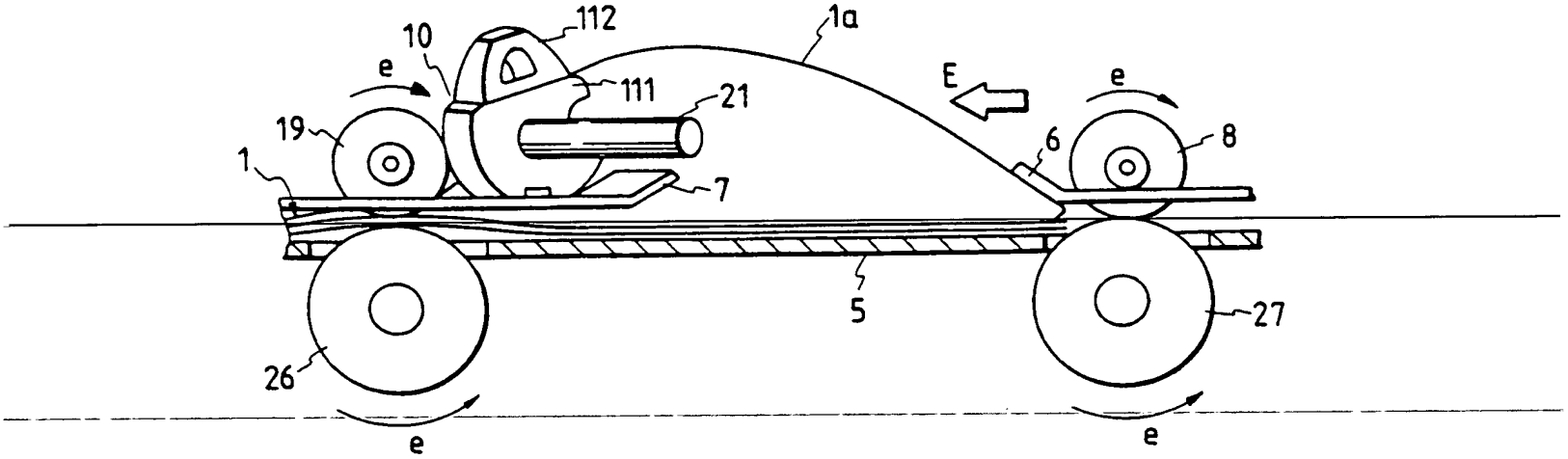


FIG. 10

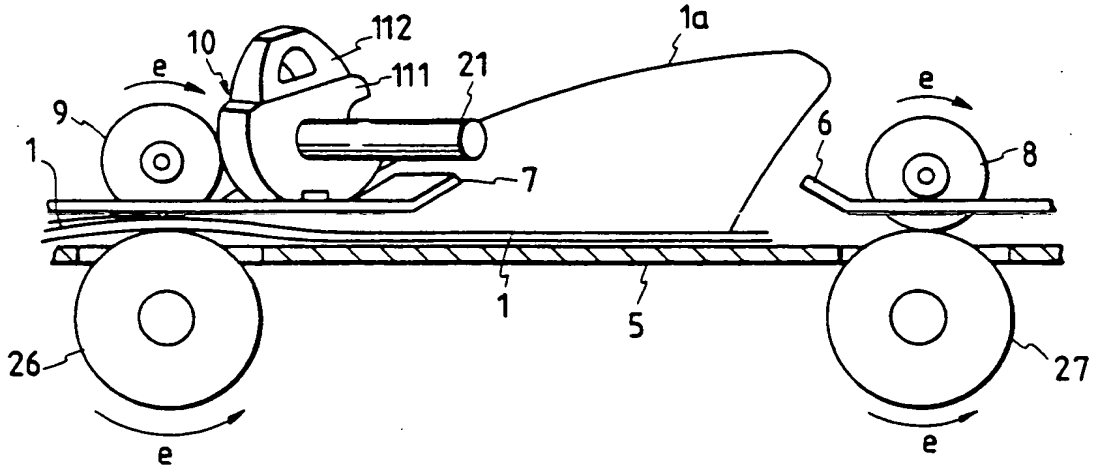


FIG. 11

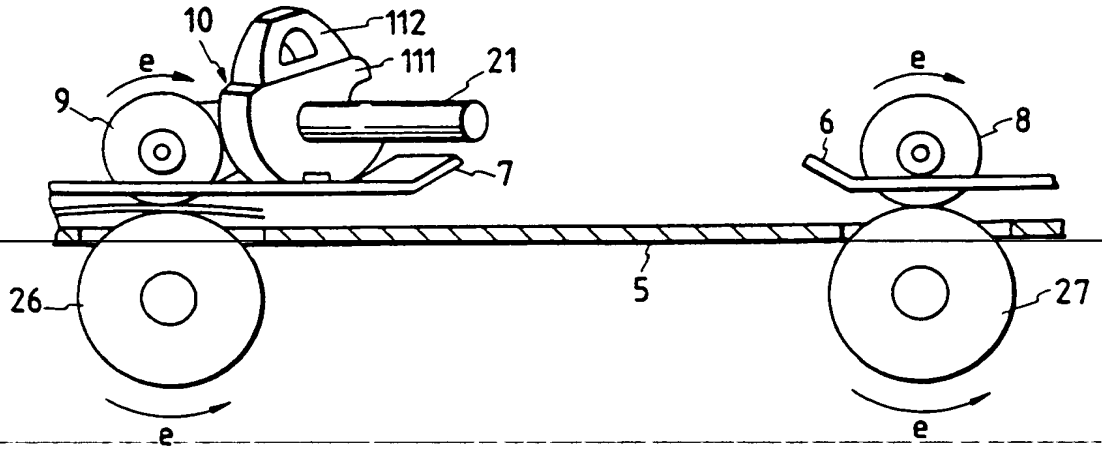


FIG. 12

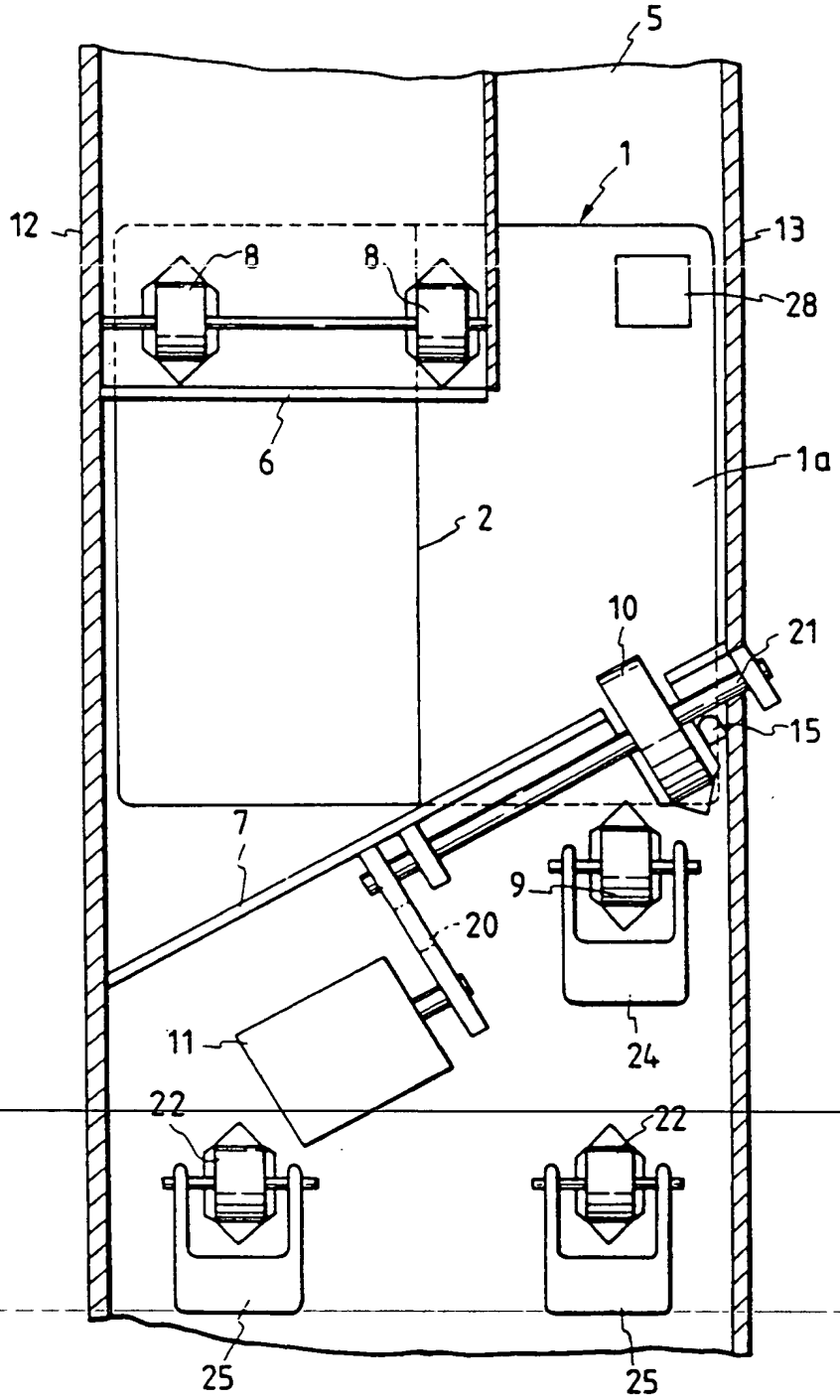


FIG. 13

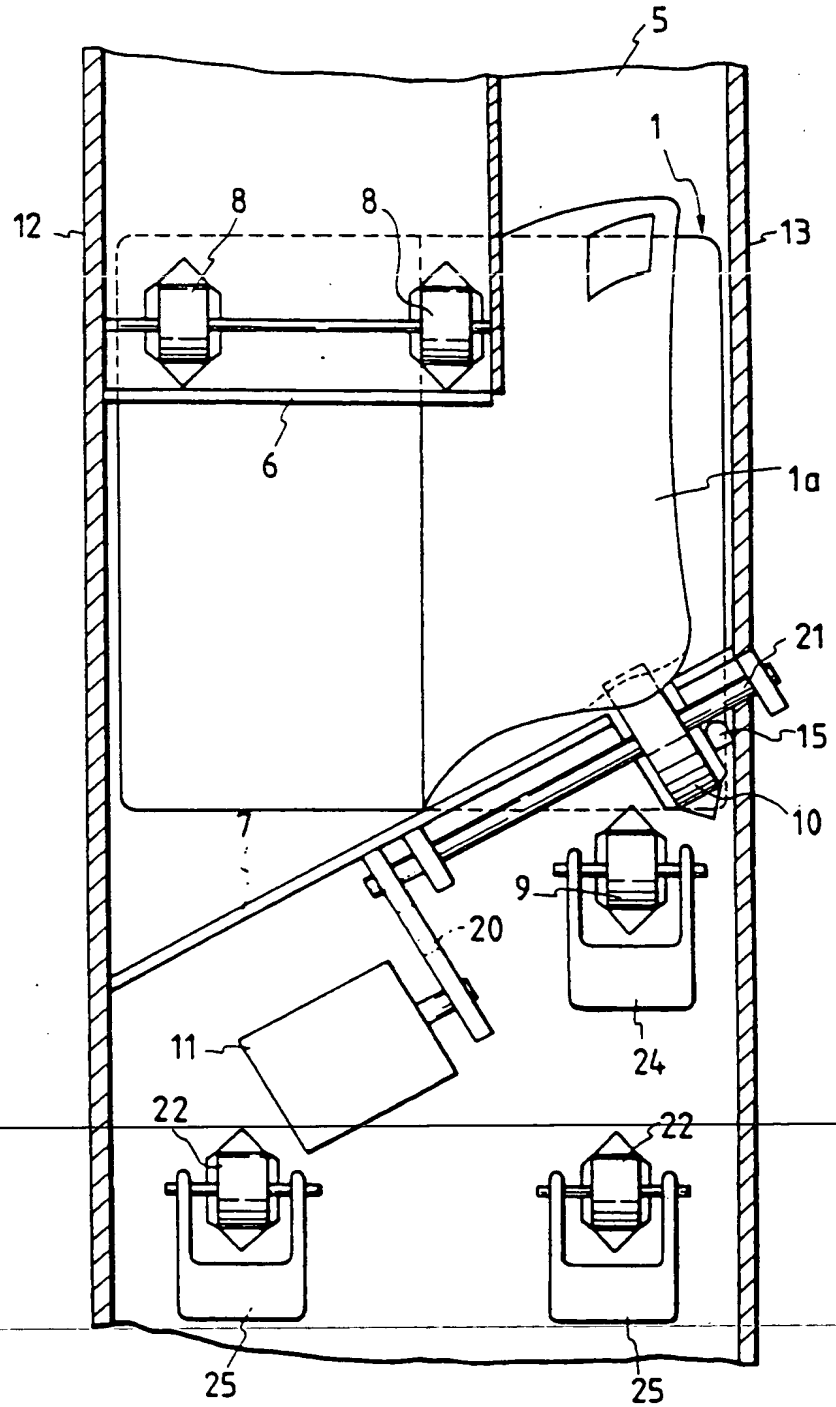


FIG. 14

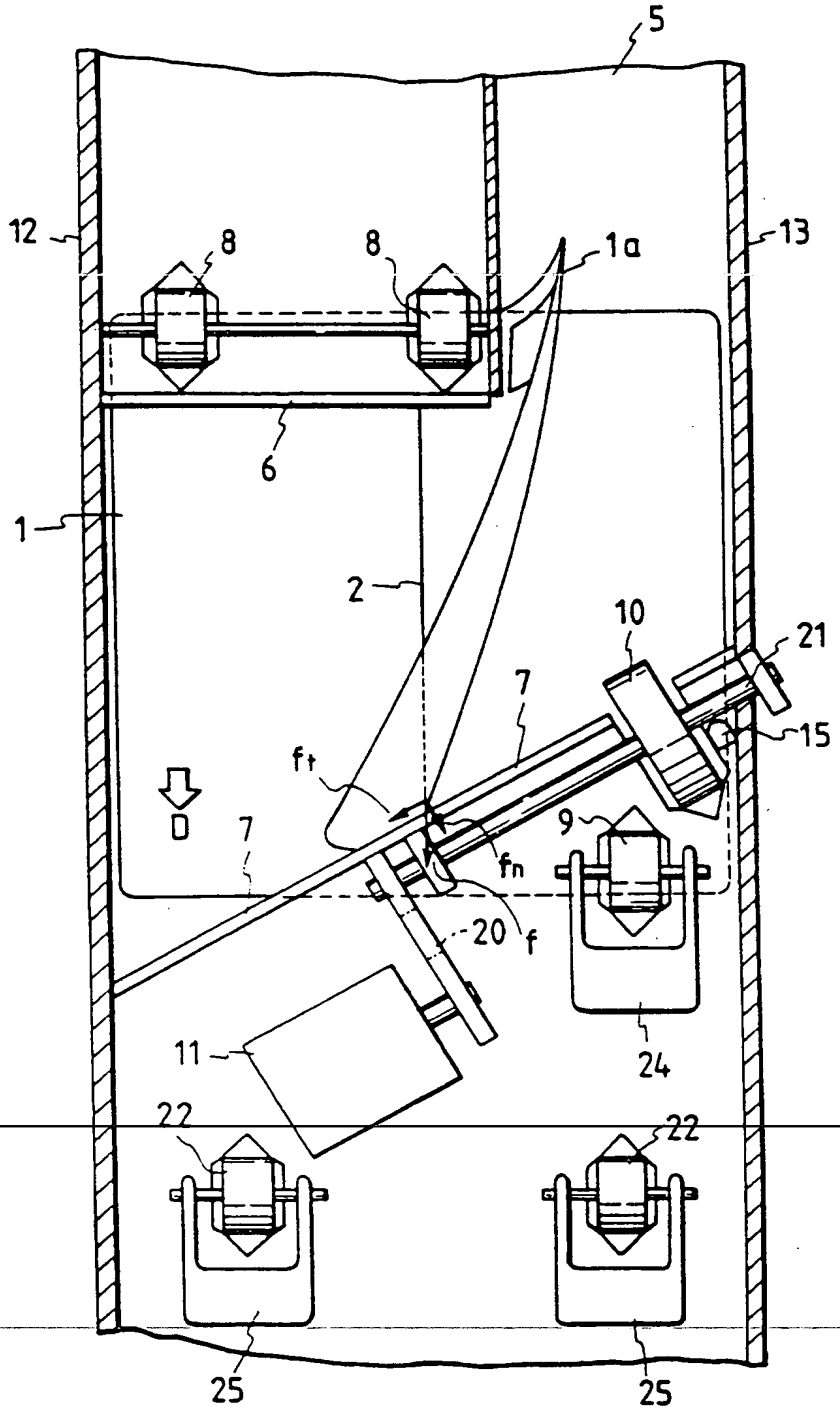


FIG. 15

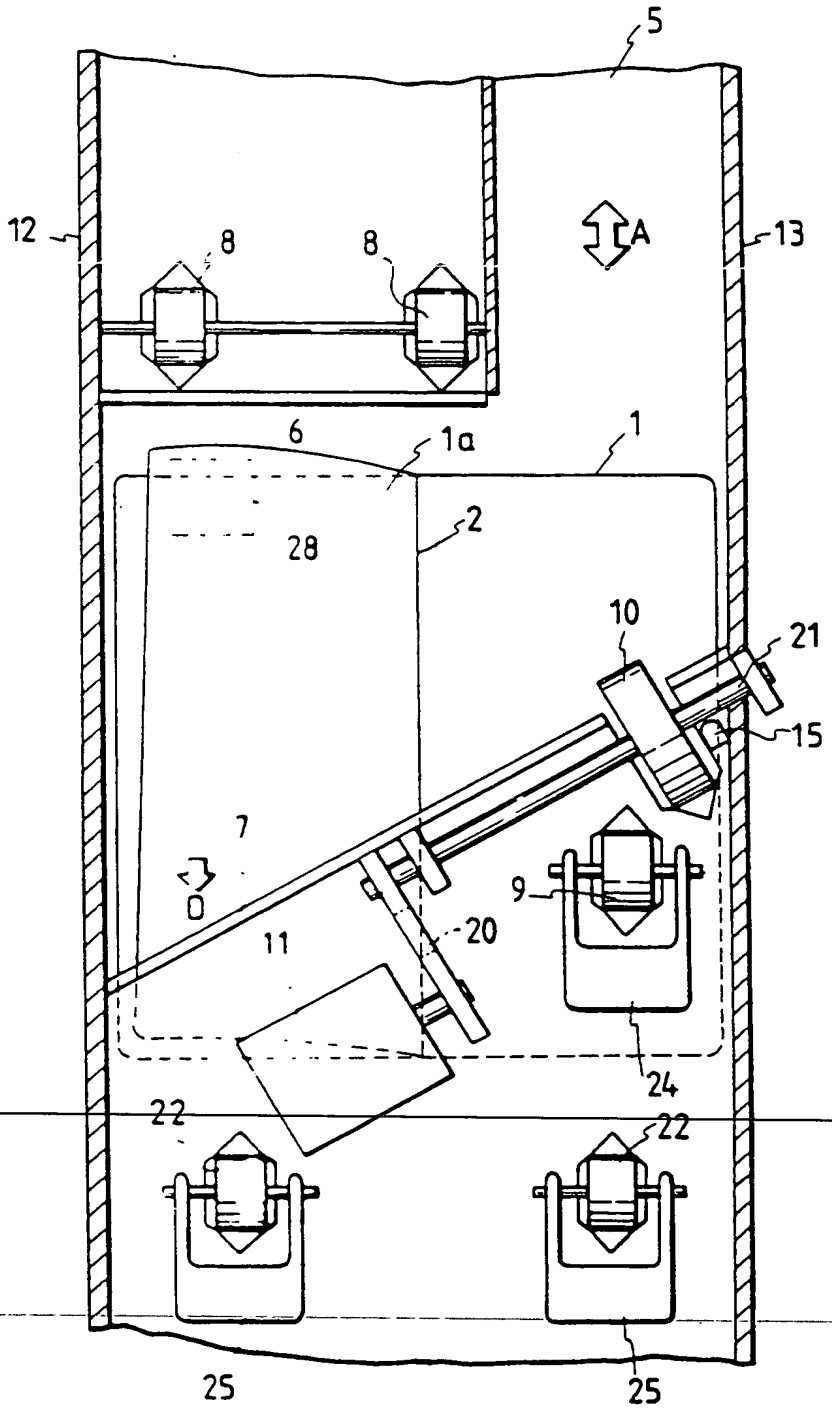


FIG. 16

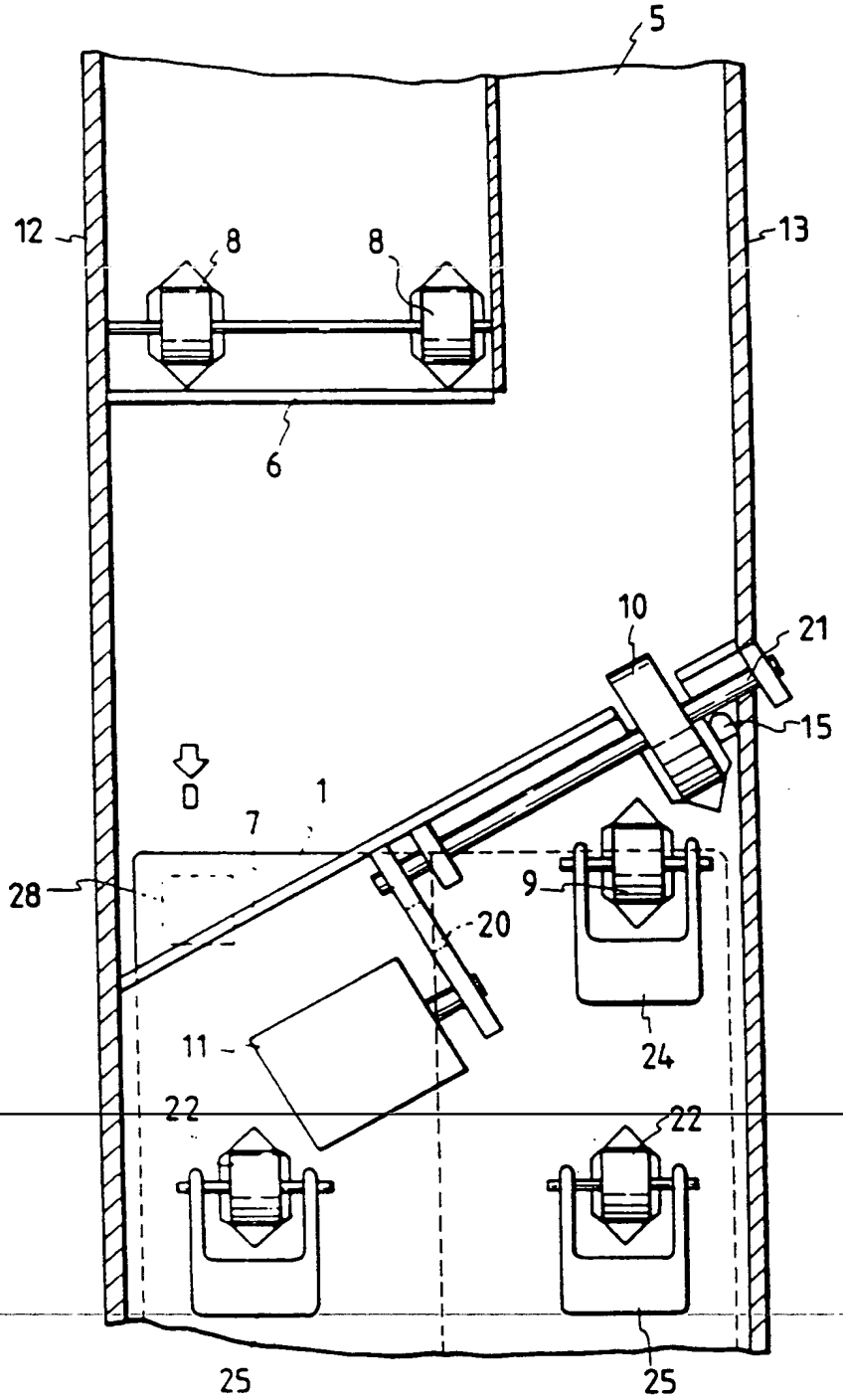


FIG. 17

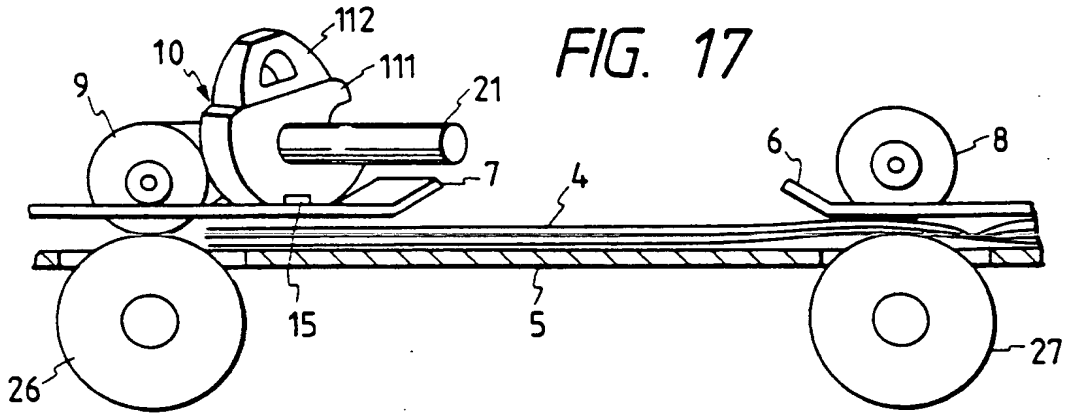


FIG. 18

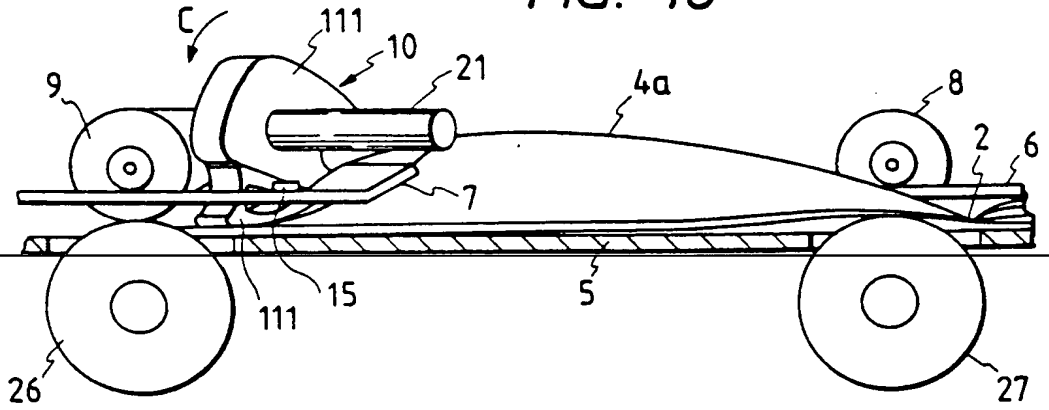


FIG. 19

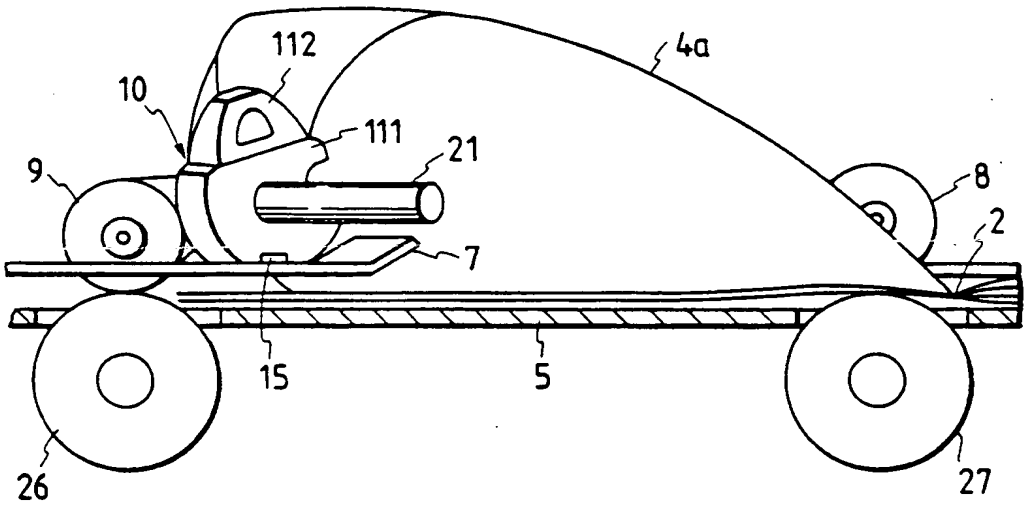

112
4a
10
111
21
9
8
2
7
15
5
26
27

FIG. 20

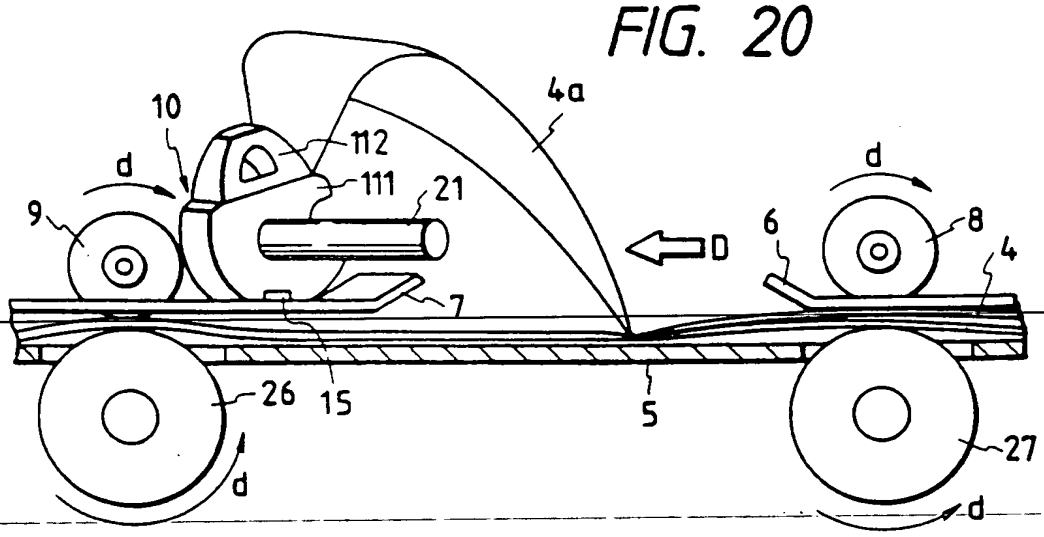

4a
10
d
112
111
21
d
9
6
8
D
4
7
26
15
5
27
d
d

FIG. 21

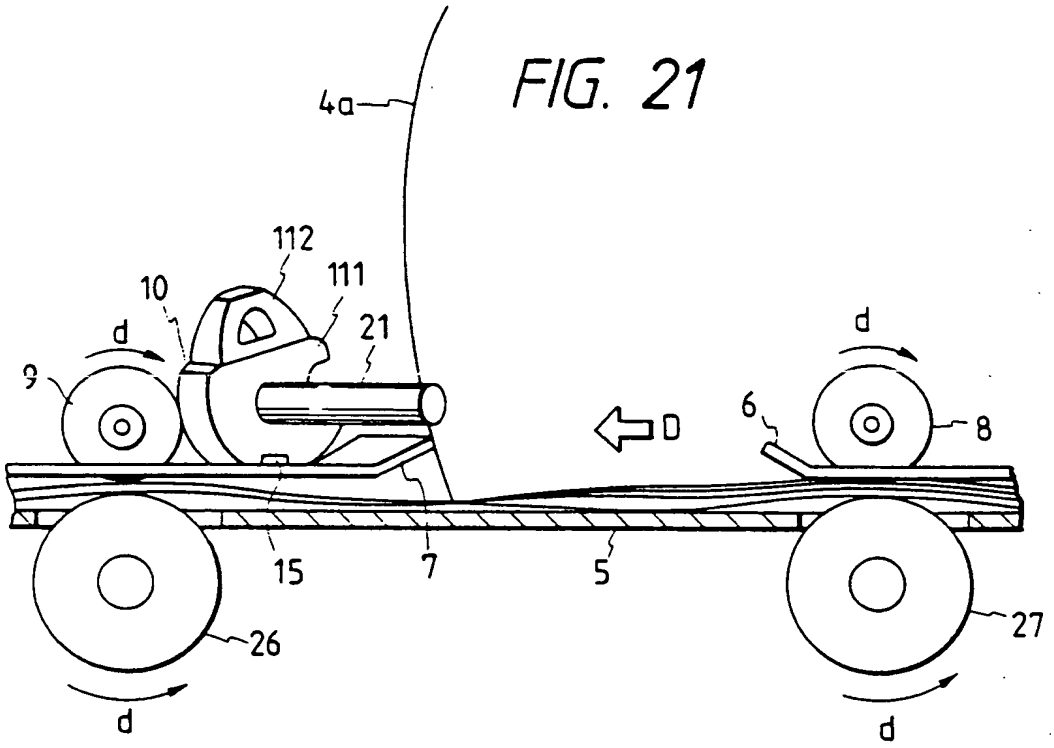

4a
112
111
10
21
d
9
D
6
8
15
7
5
26
27
d
d
d

FIG. 22

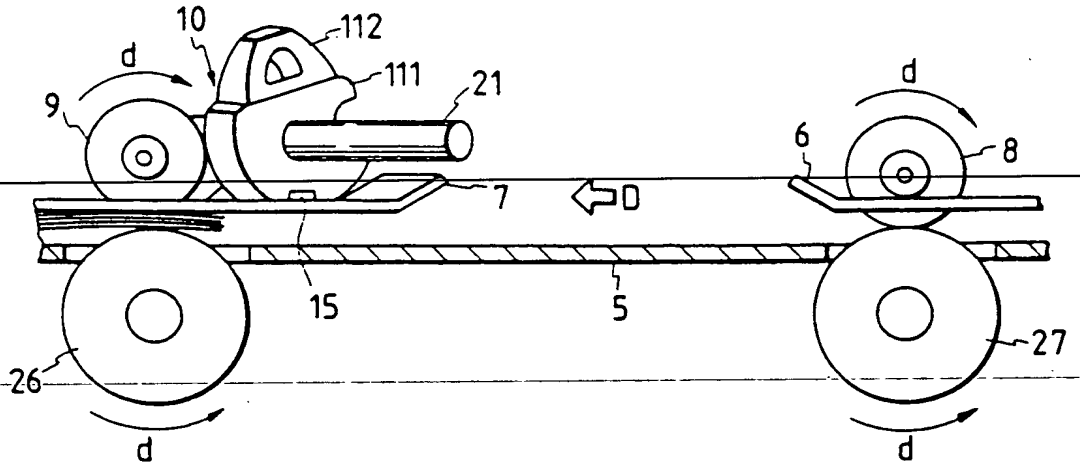

10
112
d
111
21
9
d
6
8
7
D
15
5
26
27
d
d

FIG. 23

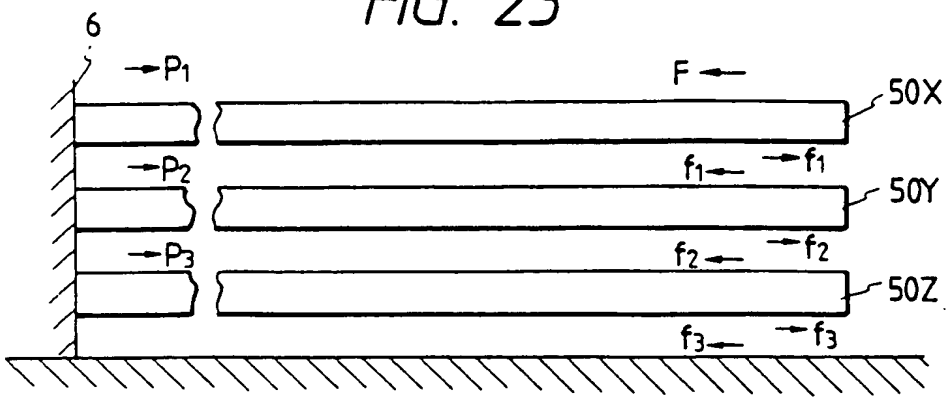

6
P1
F
50X
P2
f1
f1
50Y
P3
f2
f2
50Z
f3
f3

FIG. 24

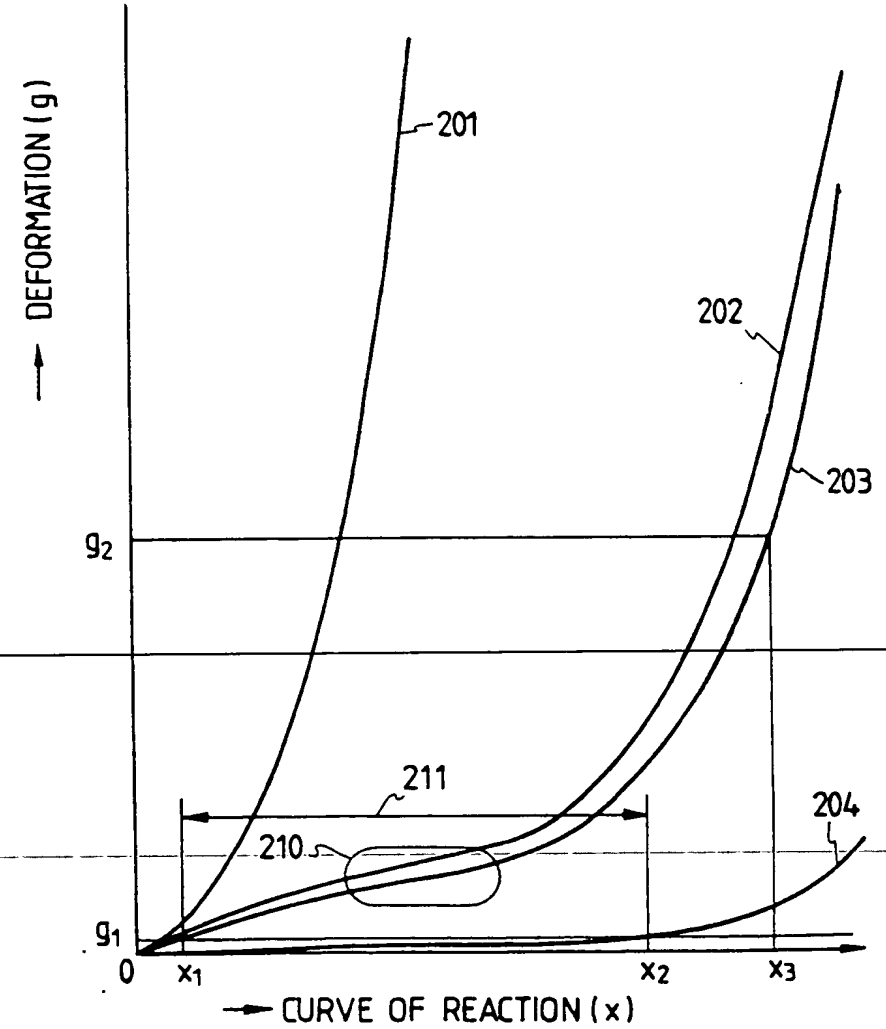

DEFORMATION (g)
201
202
203
g2
211
210
204
g1
0
x1
x2
x3
CURVE OF REACTION (x)

FIG. 25

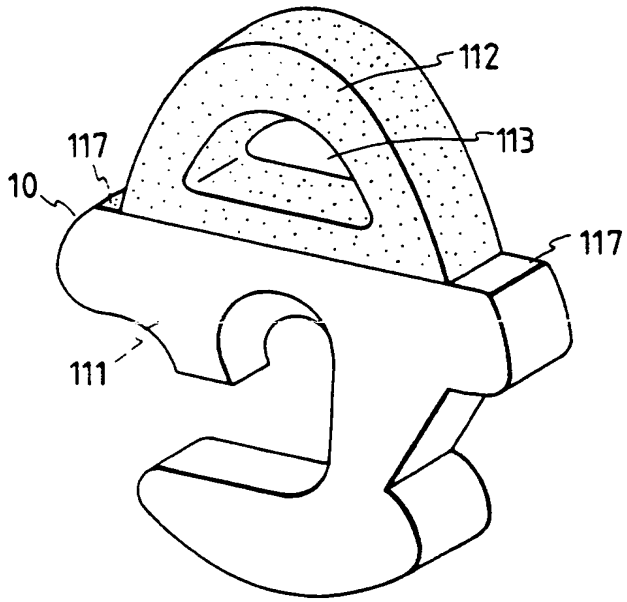
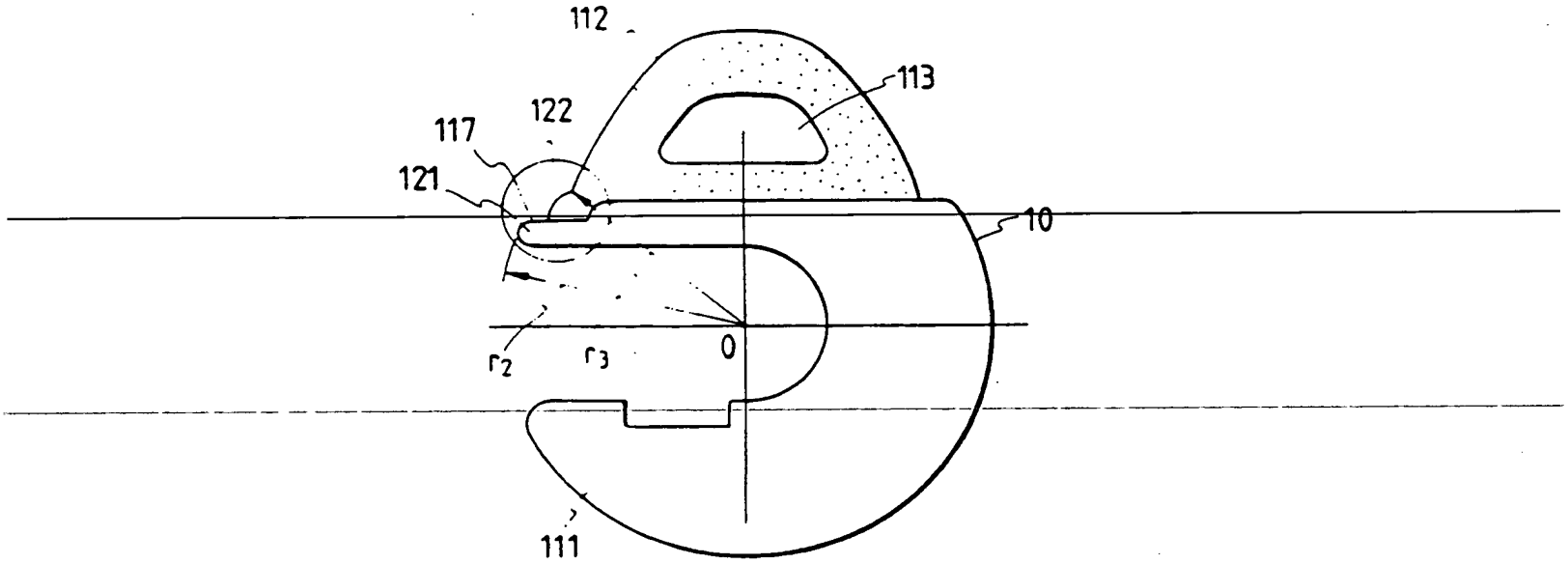
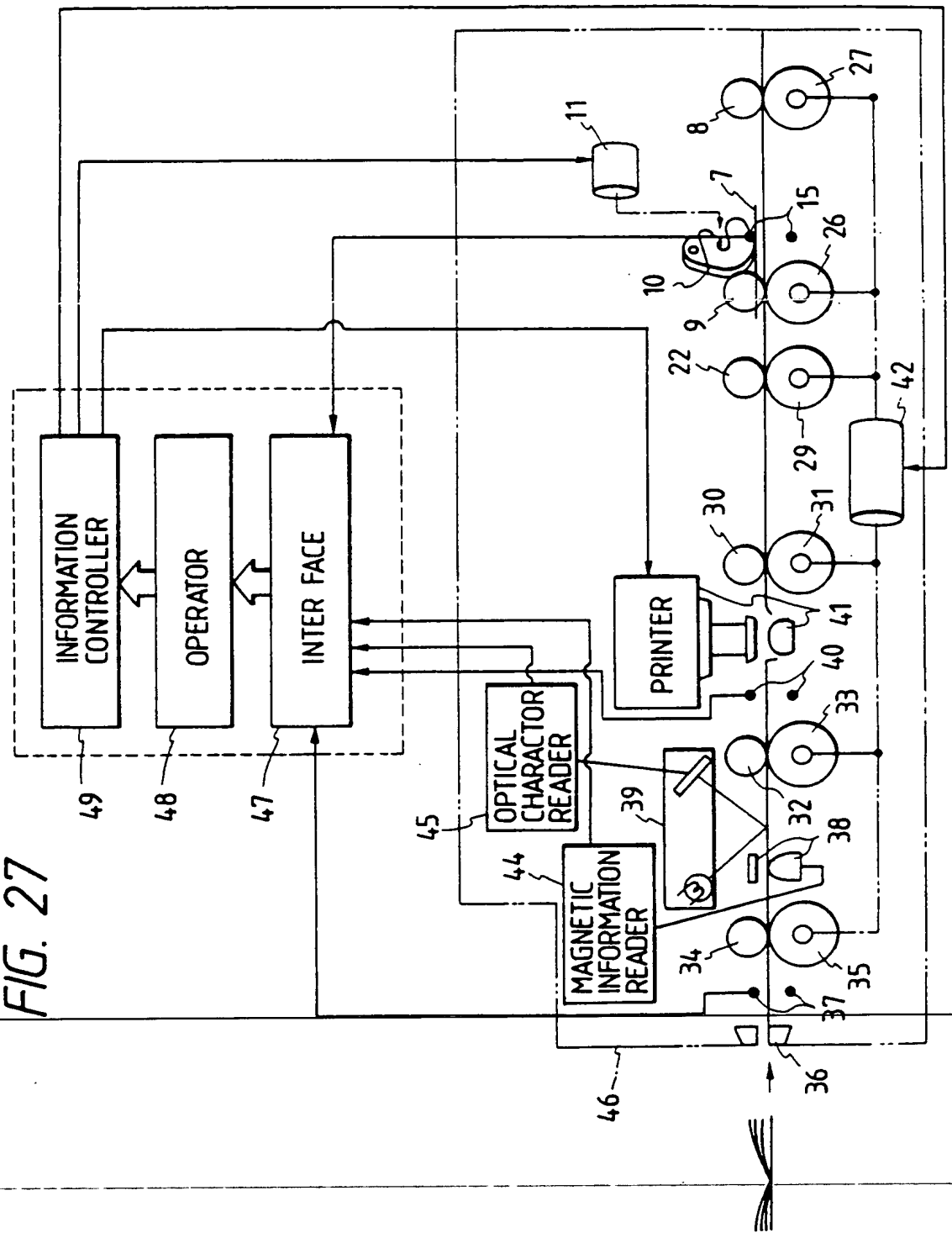


FIG. 26




INFORMATION CONTROLLER
OPERATOR
INTER FACE
PRINTER
OPTICAL CHARACTOR READER
MAGNETIC INFORMATION READER
49
48
47
45
44
46
11
8
27
7
15
26
10
9
22
29
42
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31
41
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36

FIG. 27

FIG. 28

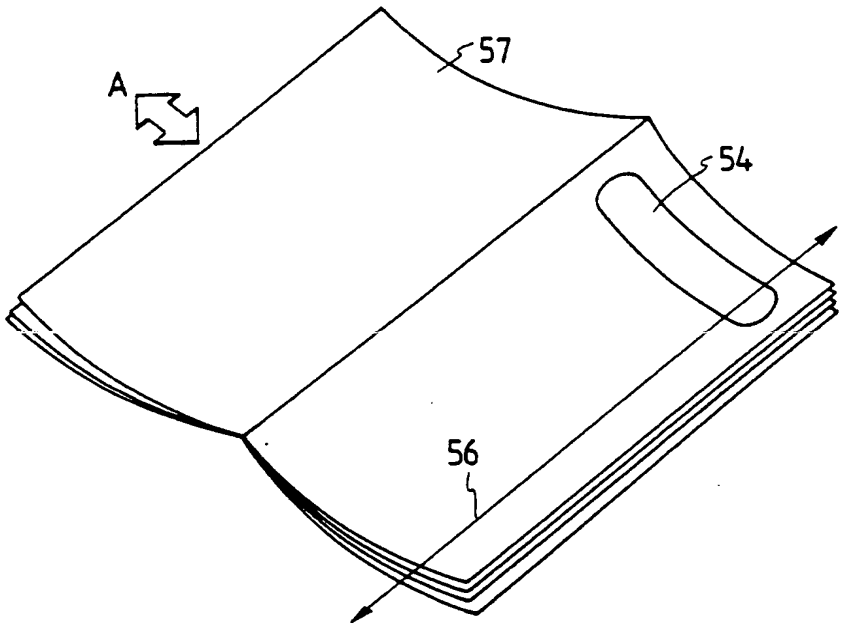

FIG. 29

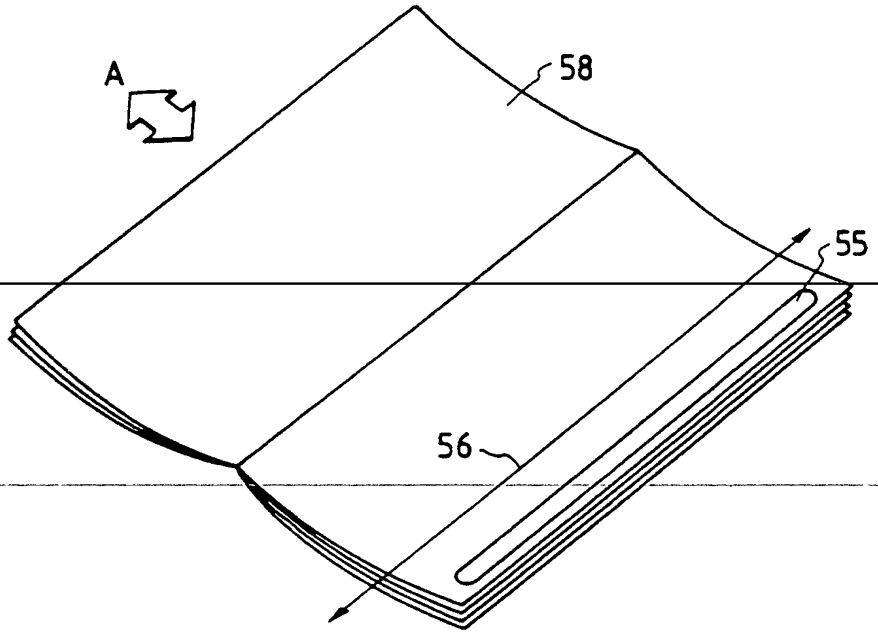

FIG. 30

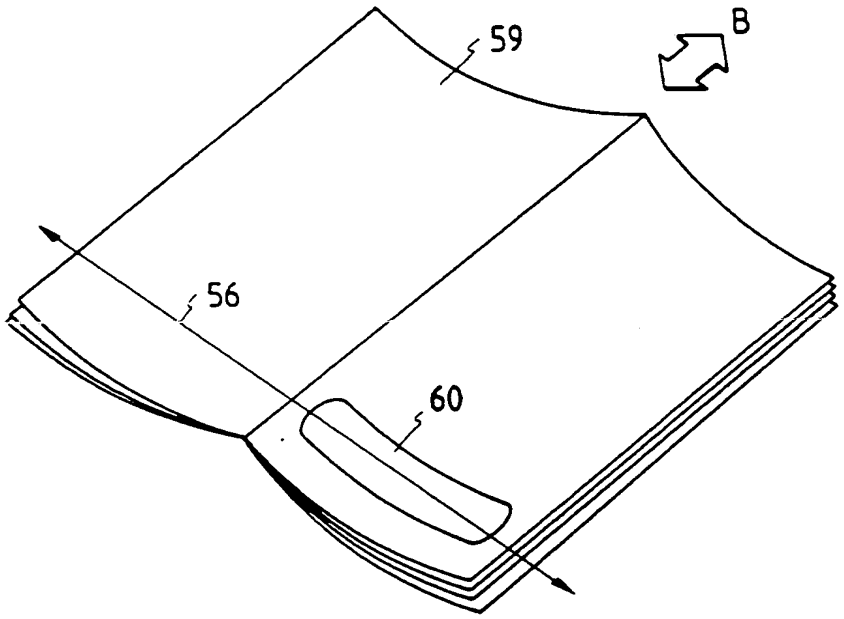

FIG. 31

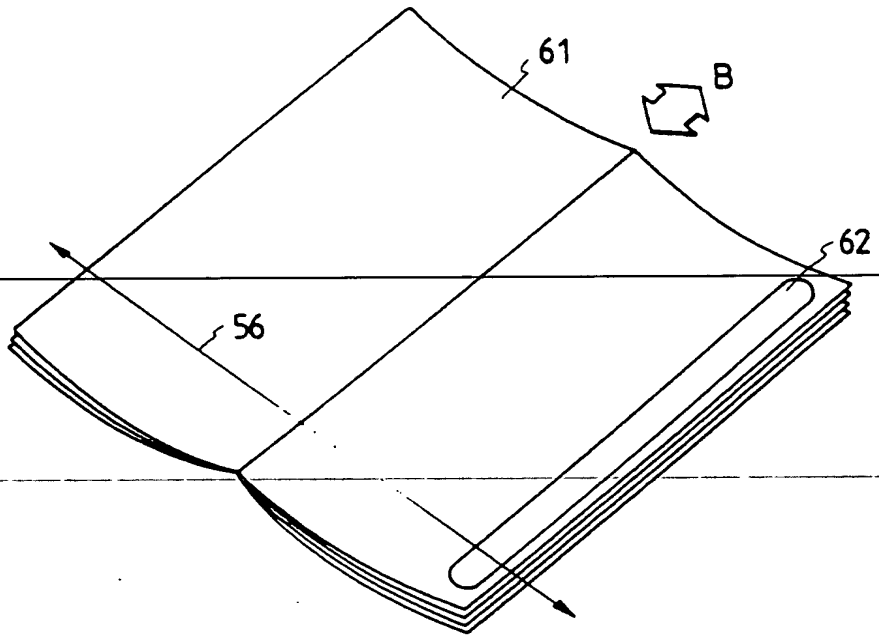

FIG. 32

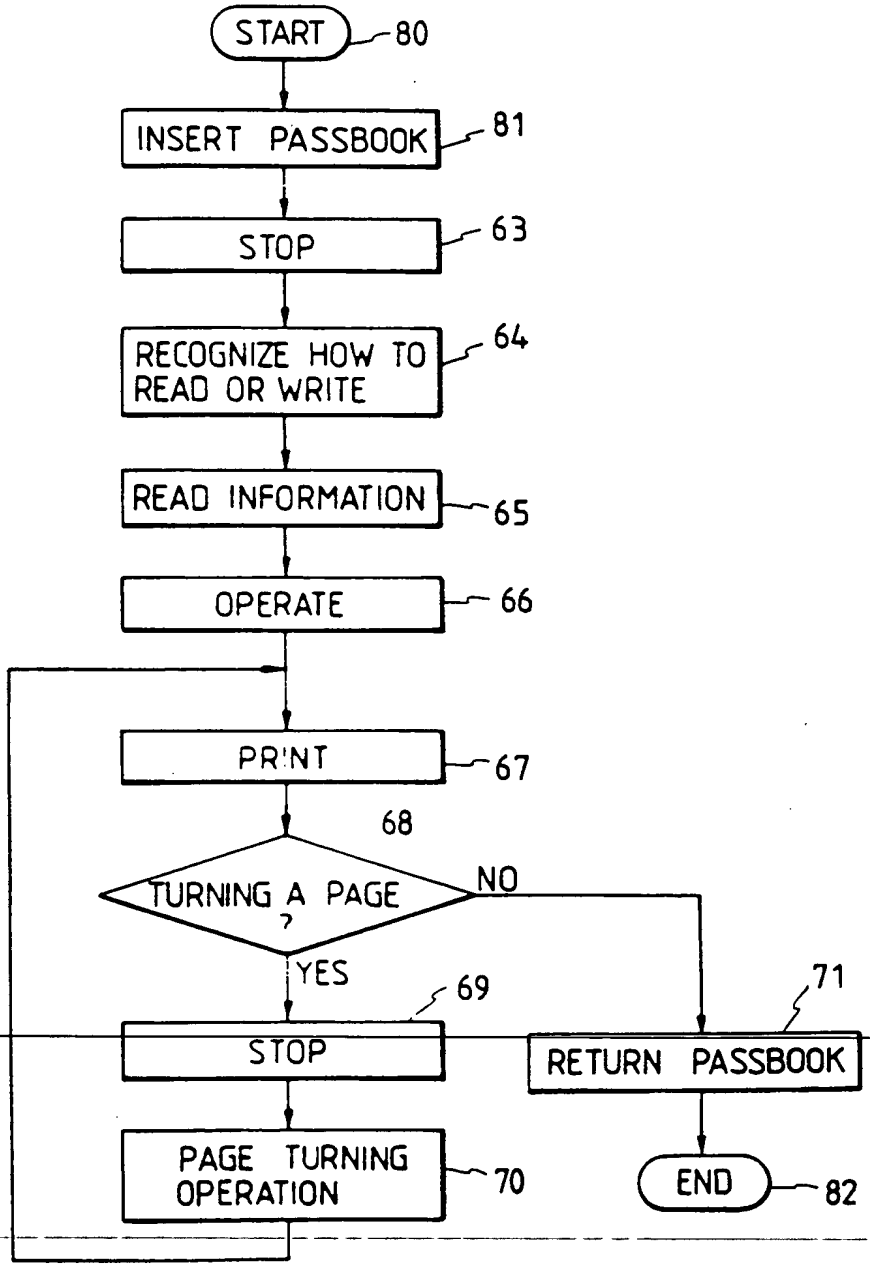
START
80
INSERT PASSBOOK
81
STOP
63
RECOGNIZE HOW TO READ OR WRITE
64
READ INFORMATION
65
OPERATE
66
PRINT
67
68
TURNING A PAGE ?
NO
YES
69
71
STOP
RETURN PASSBOOK
PAGE TURNING OPERATION
70
END
82

FIG. 33